72-13

An Announcement of
Highway Safety Literature
. . . A Bi-Monthly Abstract Journal

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SPECIAL ANNOUNCEMENT
ON PAGE 22

THIS ISSUE CONTAINS:

HS-011 145 - 011 211
HS-800 542, 614, 630 - 636,
640 - 643

U.S. Department of Transportation / National Highway Traffic Safety Administration

An Announcement of
HIGHWAY SAFETY LITERATURE
. . . A Bi-Monthly Abstract Journal

Published twice-a-month by the National Highway Traffic Safety Administration,
Research Institute, Office of Accident Investigation and Data Analysis
Washington, D.C. 20590

INTRODUCTION

Publications such as journal articles, proceedings, and research reports announced in *Highway Safety Literature* include some of the most recent additions to the collection of the NHTSA Scientific & Technical Information Service. Subject areas covered include all phases of highway, motor vehicle, and traffic safety, especially those encompassed by the National Traffic and Motor Vehicle Safety Act of 1966 and the Highway Safety Act of 1966.

Individual issues of *HSL* are numbered according to the year and the issue number within that year; thus, 72 designates the year and 1, 2, 3, etc. the individual issues. To aid the user in locating citations by the HS-number, the cover bears the inclusive entry number for each issue.

Entries in *HSL* are arranged according to the NHTSA Subject Category List shown in the Table of Contents. The list is a two-level arrangement consisting of five major subject fields subdivided into 59 subject groups. Documents related directly to the National Highway Traffic Safety Administration (NHTSA) are announced in a separate section headed NHTSA DOCUMENTS and are numbered in five distinct series: NHTSA Accident Investigation Reports (HS-600 000 series). NHTSA Compliance Test Reports (HS-610 000 series), NHTSA Contractors Reports (HS-800 000 series), NHTSA Staff Speeches, Papers, etc. (HS-810 000 series), and NHTSA Imprints (HS-820 000 series). For NHTSA DOCUMENTS in series HS-600 000 and HS-610 000, individual full case reports are available for inspection at the National Highway Traffic Safety Administration. HS-800 000 series and HS-820 000 series are available for, purchase from NTIS or GPO (see page ii). Although announced together in a separate section, these documents are also assigned specific subject categories for machine retrieval.

A document which contains a number of separate articles is announced as a complete volume in the subject category most applicable to it as a whole. Entries for the individual articles appear in their most specific subject category.

SAMPLE ENTRIES

Subject Category Array

NHSB Accession no .... HS-800 218 Fld. 5/21; 5/9

Title of document ..... AN INVESTIGATION OF USED CAR SAFETY STANDARDS--SAFETY INDEX: FINAL REPORT. VOL. 6 - APPENDICES G-L

Personal author(s) ..... by E. N. Wells; J. P. Fitzmaurice; C. E. Guilliams; S. R. Kalin; P. D. Williams

Corporate author ..... Operations Research, Inc.

Collation

Publication date 1969 150p
Contract FH-11-6921
Report no. ORI-TR-553-Vol-6; PB-190 523

Abstract ..... Appendices G-L to this study of used car safety standards include: indenture model diagrams for classes I-IV motor trucks; degradation, wear, and failure data for motor truck classes I-IV; and safety index tables for classes I-IV motor trucks.

Search terms; Wear; Trucks; Failures; Used cars; Inspection standards

AVAILABILITY: NTIS

HS-004 497 Fld. 5/19

AUTO THEFT—THE PROBLEM AND THE CHALLENGE

by Thomas A. Williams, Sr.

Journal citation ..... Published in *FBI Law Enforcement Bulletin* v37 n12 p15-7 (Dec 1968)

Gives figures on the extent of the auto theft problem and comments on anti-theft devices available now or in the planning stage.

Search terms: Theft; Theft protection; Stolen cars

(Note: If the date of a report or Journal article is not given, the small letters nd will appear)

TABLE OF CONTENTS

NOTE: ( ) Numbers in parentheses following certain subject groups indicate the Highway Safety Program Standards (No. 1, and up) and/or Federal Motor Vehicle Safety Standards (No. 101 and up) which may apply to these groups.

NOTE: Material published in Highway Safety Literature (HSL) is intended for the information and assistance of the motor vehicle and highway safety community. While brand names, equipment model names and identification, and companies may be mentioned from time to time, this data is included as an information service. Inclusion of this information in the HSL should not, under any circumstances, be construed as an endorsement or an approval of any particular product, course, or equipment by the U.S. Department of Transportation, National Highway Traffic Safety Administration.

Harry A. Feinberg
Managing Editor

AVAILABILITY OF DOCUMENTS AND INSTRUCTIONS FOR ORDERING

Articles and reports whose citations and abstracts appear in HSL are acquired from many sources, such as periodicals, journals, NHTSA Contractors' reports and NHTSA staff speeches, and other reports. Those reports other than NHTSA Contractors' reports and NHTSA generated reports and speeches (see introduction) are assigned a lower consecutive accession (HS-) number.

Department of Transportation personnel may borrow copies of publications announced in HSL from the NHTSA Technical Reference Division. Non-DOT Personnel, in the Washington, D.C. area, may borrow copies of publications for a 24-hour period only. Telephone (202) 426-2768. Government personnel in the Washington, D.C. area, use government ID phone 118-62768.

The names of the journals cited in HSL appear in *italic type* preceded by the words "Published in." The journal containing the article cited may be borrowed from most research and public libraries. Non-DOT personnel outside the Washington area should contact their company or agency libraries for assistance.

NHTSA Contractors' reports and other reports can usually be obtained as indicated under AVAILABILITY. However, there is no certainty that copies will be available for more than a limited period after a report is issued.

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NTIS: National Technical Information Service, Springfield, Va. 22151. Order by accession number: HS, AD, or PB. Prepayment is required by NTIS coupon (GPO coupons are not acceptable), check or money order (made payable to the NTIS). PC (Paper copy; full size original or reduced facsimile) prices are $3.00 up to 300 pages, $6.00 for 301 to 600 pages, $9.00 for 601 to 900 pages, and over 900 pages will be quoted on request. Surcharge is added for foreign orders. MF (microfiche approximately 4x6" negative sheet film; reader required) is $0.95 per report.

GPO: Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Give corporate author, title, personal author, and report number. Prepayment is required by GPO coupon (NTIS coupons are not acceptable), check or money order (made payable to the Superintendent of Documents).

HRB: Highway Research Board, National Academy of Sciences, 2101 Constitution Ave., N. W., Washington, D. C. 20418.

NHTSA: National Highway Traffic Safety Administration, General Services Division, Washington, D.C. 20591 (Telephone (202) 426-0874), Give HS-No.

SAE: Society of Automotive Engineers, Dept. HSL, 2 Pennsylvania Plaza, New York, N.Y. 10001. Order by SAE report numbers. Prices given are list; discounts are available to SAE members and sometimes to libraries and U.S. Government Agencies. Prepayment is required; orders received without payment are subject to a $1 handling charge.

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WHEN REQUESTING a document, to be absolutely sure you receive what you order, give the accession number (HS, PB, AD number) or report number (in cases such as an SAE document), title of report, and the personal or corporate author (whichever is cited). When requesting an HS-numbered document from NTIS, add DOT/to the prefix HS-; example HS-800 000 should be ordered as DOT/HS-800 000.

1/0 ACCIDENTS

1/2 Injuries

HS-011 145 Fld. 1/2; 5/14

THE ROENTGENOGRAPHIC APPEARANCE OF TRANSVERSE OR CHANCE FRACTURES OF THE SPINE: THE SEAT BELT FRACTURE

by Lee F. Rogers

Published in *American Journal of Roentgenology, Radium Therapy and Nuclear Medicine* v111 p844-9 (Apr 1971)

11refs

The transverse fracture of the spine was first described by Dr. Chance in 1948. They were rarely encountered before the general use of seat belts. The fracture is created by acute flexion of the body over or against some object which serves as a fulcrum. This mechanism creates ruptures of the posterior ligaments, fractures of the posterior bony elements, or some combination of both. The roentgenographic features of various combinations of injuries are presented and the importance of their recognition stressed. The author's experience with six fractures in five patients is reviewed and the "seat belt syndrome" discussed. In four of the five cases, abdominal injury also took place.

Search terms: Spinal fractures; Abdominal injuries; Seat belt caused injuries; Injury case reports; X ray diagnosis

HS-011 146 Fld. 1/2

BLAST INJURY OF THE CHEST

by M. Hirsch; J. Bazini

Published in *Clinical Radiology* v20 p362-70 (Oct 1969)

26refs

Radiological findings of 12 recent cases of blast injury to the chest are described. The clinical picture includes chest pain, dyspnea, and hemoptysis without evidence of external injury. These symptoms were masked in cases of immersion blast by the clinical picture of acute abdomen due to severe abdominal injuries. Radiological findings could be divided into two distinct groups: pulmonary hemorrhage, which showed only unilateral opacities in the lungs and which cleared within the first week; and pulmonary laceration, which showed widespread signs in the thoracic organs, often suggested by the presence of interstitial emphysema, pneumomediastinum, or hemothorax. In four cases there was associated cardiac enlargement and widening of the azygos vein due to right heart failure secondary to extensive lung damage. Recognition of radiological signs of pulmonary laceration is required for careful emergency therapy.

Search terms: X ray diagnosis; Chest injuries; Blast injuries; Lung injuries; Abdominal injuries; Heart injuries; Injury case reports; Dypsnea; Pain; Hemorrhage; Impact caused lacerations; Immersion; Emphysema; Heart arrest

1/3 Investigation

HS-011 147 Fld. 1/3; 3/4

IDENTIFYING UNIQUE DRIVING-EXPOSURE CLASSIFICATIONS

by Philip S. Carroll; William L. Carlson; Thomas L. McDole

Published in *HIT Lab Reports* p1-4 (Sep 1971)

2 refs

Exposure data (estimates of vehicle miles of travel) were obtained in a national survey of 7,145 drivers. By successive analyses of data variability, exposure classes were defined according to the interactions among independent variables—driver, vehicle, road, and environment characteristics. The best predictors of exposure were those which established whether the driver drove on the job, the driver's sex, the type of vehicle driven, and the percentage of driving done on city streets. A hierarchy of exposure-variable interactions is recommended for future surveys, limited to variables presently included on accident report forms so that accident rates may be computed. The hierarchy variables, in order of importance, are vehicle type, driver sex, road type, day/night, driver age, and vehicle model year; their interactions define 26 unique exposure classes.

Search terms: Accident risk forecasting; Vehicle mileage; Driver vehicle road interfaces; Environmental factors; Variables; Driver sex; Vehicle characteristics; Accident rates; Accident report forms; Highway characteristics; Day vs night accident risks; Driver age; Accidents by vehicle age; Professional drivers; Driving conditions

HS-011 148 Fld. 1/3

THE ROLE OF THE ACCIDENT INVESTIGATOR

by G. M. Mackay

Published in *Journal of the Forensic Science Society* v10 p245-54 (Oct 1970)

6refs

Some forensic aspects of road accident investigation are discussed: driver identification in fatal accidents, collision dynamics, vehicle lighting at time of impact, and estimation of speeds in collision between vehicles. Broader benefits from improved liaison between those who are investigating accidents and those who can influence their prevention are outlined. Special emphasis is put on the relationships of injury to particular components in vehicles and their importance both in reconstructing accidents and in informing the vehicle manufacturer about the performance of his designs in

1/3 Investigation (Cont'd.)

HS-011 148 (Cont'd.)

actual accidents. Improved liaison between the pathologist and the research worker is particularly urged.

Search terms: Accident investigation; Forensic medicine; Accident reconstruction; Driver identification in accidents; Fatalities; Vehicle dynamics; Vehicle lighting; Injury causes; Safety design; Automobile design; Secondary collisions; Crash phase; Vehicle vehicle collisions; Speed

HS-011 149 Fld. 1/3; 1/5; 3/3; 5/3

AN EVALUATION OF MOTOR VEHICLE ACCIDENTS INVOLVING MOTORCYCLES–SEVERITY, CHARACTERISTICS, EFFECTS OF SAFETY REGULATIONS

New York (State) Dept. of Motor Vehicles

1969 60p
Report no. DMV-RR-1969-12

Although only 5% of motorcycles are involved in accidents, 95% of those result in injuries. A detailed comparison of motorcycle accidents in 1966 and 1967 indicated a 40% reduction in fatalities after helmets were required and a one-third reduction in serious head, neck, or face injuries. Contributing factors in accidents, by decreasing order of importance were: road conditions, animals, mechanical defects, unlicensed operators, violations of safety equipment requirements, drinking, police duties, and drugs. Safety recommendations were developed. Accident summaries, laws and regulations, and make and year of fatal accident involved motorcycles are given.

Search terms: Motorcycle accidents; Motorcycle laws; Motorcycle operator injuries; Motorcycle operator fatalities; New York (State); Accident statistics; Accident causes; Injury prevention; Accident severity; Headgear laws; Injuries by body area; Injury severity; Motorcycle passenger fatalities; Motorcycle passenger injuries; Age factors; Time of accidents; Accident factors; Head injuries; Neck injuries; Facial injuries

1/5 Statistical data

HS-011 150 Fld. 1/5

THE SPECTRAL ANALYSIS OF FATAL ACCIDENT TIME SERIES

by J. A. Green

Published in *HIT Lab Reports* p5-8 (Sep 1971)

2refs

The use of spectral analysis to reveal repetitive features in highway accidents is illustrated by an application of this technique to the Michigan fatal accident record for the 1969 calendar year. The time series of fatal accidents by week and by day are used to demonstrate the ability of spectral analysis to determine frequencies in the data and to rank the frequencies in terms of their amplitude or spectral strength. The technique may have value in locating accident patterns that might otherwise escape observation. Day and night fatal accident data are analyzed.

Search terms: Time series analysis; Statistical analysis; Accident statistics; Fatalities; Time of accidents; Accident analysis; Day vs night accidents; Michigan; Day of week; Accident studies; Spectral analysis

HS-011 151 Fld. 1/5; 2/4

STUDY OF BOX-BEAM MEDIAN BARRIER ACCIDENTS

by Joseph V. Galati

Published in *Highway Research Board Special Report* n107 p133-9 (1970)

1ref

Paper sponsored by Committee on Guardrail, Median Barriers and Sign, Signal and Lighting Supports.

This study was performed to evaluate the effectiveness of a newly installed box-beam median barrier with respect to its ability to sustain damage from vehicles and prevent median crossings. About 9.4 miles of barrier was inspected and 204 incidents of damage recorded. Of these, 75% were classified as minor, 20% medium, and 5% major, one of which was a breakthrough. The damage sustained by the box-beam barrier reflects its design concept, strong rail and weak posts. It appears that motorists who hit the barrier were able to maintain control of their vehicles and continue on their trips, since 84% of the damage incidents were not reported to the police.

Search terms: Vehicle barrier collisions; Median barrier design; Median crossover collisions; Vehicle control; Impact tolerances; Damage severity; Unreported accidents; Box beams; Barrier deformation; Median encroachments; Accident statistics

HS-011 152 Fld. 1/5; 3/3; 5/3

MOTORCYCLE FACTS

National Safety Council

1971 8p 19refs

Data are given on: types of motor vehicles involved in accidents; the increase in motorcycle rider deaths; fatality differentials between motorcyclists and all other vehicle occupants; severity of motorcycle accidents; types of motorcycle accidents; environmental factors; driver experience, age, sex, and residence; use of protective headgear; and make and weight of motorcycle.

Search terms: Accident statistics; Motorcycle accidents; Accident rates;

Accident types; Motorcycle operators; Environmental factors; Motorcycle operator experience; Motorcycle operator fatalities; Accident severity; Driver age; Driver sex; Driver residence; Headgear; Motorcycle characteristics; Fatality differentials

HS-011 153 Fld. 1/5

MOTOR VEHICLE TRAFFIC ACCIDENTS, LIMITED ACCESS EXPRESSWAY SYSTEM, INCLUDING INTERSTATE HIGHWAYS I-84, I-91, AND I-95

by R. M. Williston

Connecticut State Hwy. Dept.

1969 19p
Report no. TR-10

Prepared in cooperation with Bureau of Public Roads.

For the five-year period ending 31 December 1966, 16,456 accidents took place on limited access highways in Connecticut; this was 15% of the vehicle accidents in the state. Fixed objects were involved in 32% of expressway accidents. Of fatal accidents, 54% involved a fixed object. Almost 42% of expressway accidents were injury producing, about the same as for all highway types. Of the fixed object collisions, guardrails and median barriers caused both the largest number of accidents and of injuries. In a few accidents, the vehicles struck a bridge pier.

Search terms: Accident statistics; Accident studies; Fatalities; Vehicle fixed object collisions; Accident severity; Vehicle barrier collisions; Bridge parapets; Guardrails; Median barriers; Connecticut; Freeways; Controlled access highways; Accident location; Accident types; Rear end collisions; Fixed objects; Roadside hazards

2/0 HIGHWAY SAFETY

HS-011 154 Fld. 2/0

TIME FOR NEW DECISIONS IN HIGHWAY SAFETY

by Howard Pyle

Published in *Traffic Quarterly* v25 n4 p487-98 (Oct 1971)

The history of the highway safety movement is outlined. Past emphasis has been on the mileage death rate, which dropped from 17.9 per 100,000,000 vehicle miles in 1925 to 4.9 in 1970. Later emphasis on the Interstate Highway System was a great breakthrough in safety. The passage of the Highway Safety Act of 1966 and the adoption of safety standards were great steps forward. The climate for new decisions ahead is discussed. The annual economic waste from highway accidents is more than $12.8 billion, and much remains to be accomplished in highway safety. It is recommended that cost effectiveness should be the deciding factor in decision making, and that systems analysis should be applied to the problems of highway safety.

Search terms: Accident costs; Benefit cost analysis; Systems analysis; Highway safety programs; Highway Safety Act of 1966; Highway safety standards; Decision making; Accident costs; History; Fatality rates; Vehicle mileage; Interstate Highway System

HS-011 155 Fld. 2/0

THE ROAD AHEAD FOR TRAFFIC SAFETY?

by John V. Grimaldi

Published in *Traffic Quarterly* v25 n4 p587-602 (Oct 1971)

The history of the traffic safety movement is outlined. Since 1966 the motor vehicle has been the center of attention, with fatality reduction the first priority. Other traffic safety efforts have dropped out of fashion. The role of technology versus the role of the individual in traffic safety are discussed. Better measures of safety achievements and support for research and training are needed.

Search terms: Highway safety programs; Defective vehicles; Fatality prevention; Technology; Safety research; Safety education; Priorities

2/2 Communications

HS-011 156 Fld. 2/2

CHARACTERISTICS OF MOTORIST AID COMMUNICATIONS SYSTEMS

by T. K. Cranston; James H. Kell

Published in *IEEE Transactions on Vehicular Technology* vVT-19 n1 p74-81 (Feb 1970)

14refs

The nature and magnitude of the demand for emergency communications generated by users of rural freeways is described. A classification diagram of potential communications systems is presented and a preliminary selection of candidate systems is made on the basis of overall technical and economic considerations. The operating efficiency of the selected systems is analyzed in terms of their estimated detection efficiency and detection time performance. This analysis when combined with system cost projections demonstrates that a one-mile interval terminal design providing two-way voice communication between the motorist and an aid dispatch center provides the best benefit-cost ratio consistent with a satisfactory level of service. The operational characteristics of the selected system are described.

Search terms: Driver aid systems; Systems analysis; Benefit cost analysis; Emergency reporting systems; Highway communications; Communication systems; Rural highways; Freeways; Roadside telephones; Radio communication

2/3 Debris Hazard Control and Cleanup

HS-011 157 Fld. 2/3

PUBLIC SAFETY RESPONSIVENESS TO, AND ON-SITE MANAGEMENT OF, HIGHWAY INCIDENTS

by Lawrence A. Pavlinski

National Hwy. Safety Bureau

Published in *Highway Research Board Special Report* n107 p6-11 (1970)

1ref

Paper sponsored by Committee on Highway Safety.

The highway safety standard for debris hazard control and cleanup is discussed. The standard goes beyond the removal of wreckage and litter. It attempts to eliminate environmental hazards associated with highway incidents involving debris. It emphasizes planning, coordination of effort, and training of personnel to carry out the plans.

Search terms: Debris removal; Accident location; Highway safety standards; Environmental factors; Emergency road services; Public opinion; Community support; Emergency reporting systems; Highway communication

2/4 Design and Construction

HS-011 158 Fld. 2/4

SYSTEM EVALUATION OF FREEWAY DESIGN AND OPERATIONS

by Brian L. Allen; Adolf D. May

Published in *Highway Research Board Special Report* n107 p45-59 (1970)

Paper sponsored by Committee on Freeway Operations.

Techniques adopted and results obtained in conducting a system evaluation of freeway design and operations on 70 miles of freeway in the San Francisco Bay Area are discussed. Some 30 critical areas were identified and their design and operational deficiencies determined. The effects of each bottleneck were estimated in terms of delay, and various design and operational improvement plans were evaluated.

Search terms: Systems analysis; Freeways; Highway design; San Francisco; Traffic congestion; Traffic capacity; Highway improvements; Mathematical analysis; Traffic management; Traffic impedances; Traffic flow; Traffic data analysis; Traffic delay minimization; Traffic volume; Traffic density; Speed patterns; Speed volume relationships; Peak hour traffic

HS-011 159 Fld. 2/4

ONE-WAY GUARDRAIL VEHICLE ARRESTING SYSTEM

by Don L. Ivey; T. J. Hirsch

Published in *Highway Research Board Special Report* n107 p109-18 (1970)

4refs

Paper sponsored by Committee on Guardrail, Median Barriers and Sign, Signal and Lighting Supports.

A system consisting of two continuous parallel lengths of guardrail installed about 12 feet apart on a highway median was subjected to four full-scale crash tests. Each guardrail is constructed so that a vehicle that is out of control will lay down the first guardrail it encounters when traveling into the median. The vehicle is then trapped between the rigid faces of guardrail on both sides and cannot reenter the highway or cross the median strip into the opposing traffic. The purpose of this program was to determine if such a guardrail could arrest vehicles traveling at 60 mph and impacting at angles of 10 to 30 degrees. It is concluded that the system is adequate for containing vehicles at somewhat less than 60 mph and impact angles slightly less than 30 degrees. All tests in which the vehicles were contained show deceleration levels well within the tolerance limits of restrained humans. The system is recommended for problem areas where a rebounding vehicle would be most dangerous or a disabled car would block traffic.

Search terms: Vehicle trajectories; Barrier collision tests; Guardrail impact tests; Guardrail design; High speed impact tests; Impact angle; Impact tolerances; Impact forces; Impact protection; Median enroachments; Deceleration tolerances

HS-011 160 Fld. 2/4

LOCATION, SELECTION, AND MAINTENANCE OF HIGHWAY TRAFFIC BARRIERS

by J. D. Michie; M. E. Bronstad

Southwest Res. Inst.

1971 108p 50refs
Report no. NCHRP-118

Research sponsored by the American Association of State Highway Officials in cooperation with the Federal Highway Administration.

Barrier systems are either longitudinal–guardrails, median barriers, and bridge rails; or crash cushions–such as nests of steel drums. Emphasis is placed on reducing the number of such installations, as traffic barriers are hazards in themselves. Warrants for installation are given with selection procedure for barrier systems proven by full-scale crash tests and satisfactory service.

Search terms: Barrier deformation; Energy absorbing barriers; Guardrail design; Accident risk forecasting; State of the art studies; Accident location; Barrier design; Barrier collision tests; Guardrail impact tests; Barrier

warrants; Deceleration tolerances; Mathematical analysis; Fixed objects; Median barrier design; Impact forces; Crash cushions; Roadside hazards; Bridge parapets; Priorities

AVAILABILITY: HRB $5.20

2/8 Police Traffic Services

HS-011 161 Fld. 2/8; 1/4; 3/4

TRAFFIC LAW ENFORCEMENT: WHERE DO WE GO FROM HERE?

by Franklin M. Kreml

Published in *Traffic Quarterly* v25 n4 p499-503 (Oct 1971)

The concept of selective enforcement attempts to analyze where and when accidents take place and what the leading causes are, and then focus enforcement attention in major accident locations. The concept goes back 35 years, but benefit cost analysis is now being applied to it. Recommendations of the President's Task Force on Highway Safety are discussed as regards enforcement and its effectivenes in improving driver performance. The problem of drinking drivers and drug addicted drivers is discussed. Recommendations to improve driver licensing procedures are made.

Search terms: Law enforcement effect on accident rates; Police traffic services; Traffic law enforcement; Accident location; Benefit cost analysis; Drinking drivers; Drug addiction; Driver intoxication; Driver licensing; Driver performance; Driver behavior

2/9 Traffic Control

HS-011 162 Fld. 2/9

COMPARISON OF EXPERIMENTAL RESULTS WITH ESTIMATED SINGLE LANE BUS FLOW THROUGH A SERIES OF STATIONS ALONG A PRIVATE BUSWAY

by Jerold W. Scheel; James E. Foote

General Motors Res. Labs

1969 34p
Report no. GMR-888

This publication compares experimental results with the estimated behavior and performance of single lane bus flow through a series of stations along a private right-of-way. Six buses were driven as a convoy through a series of simulated passenger stations, stopping at each station to simulate the dwell time associated with stopping for passenger pickup and discharge. A seventh bus was used to simulate the phasing relationship between platoons of buses operating along the same right-of-way with no passing permitted. Experimental capacities exceeded those predicted by a computer model. Platoon operation was affected by variables such as distance between stations, cruise speed between stations, headway between platoons, space between buses stopped in the station, departure interval of successive buses from a station.

Search terms: Variables; Busways; Bus platoons; Station spacing; Speed volume relationships; Right of way (land); Time headways; Traffic flow; Distance headways; Traffic capacity; Waiting time; Bus lanes; Vehicle spacing; Speed patterns; Computerized simulation; Time intervals; Simulation models; Traffic models

HS-011 163 Fld. 2/9

PAVEMENT CUTTING TO IMPROVE SKID CHARACTERISTICS OF PAVEMENTS

by S. L. Fuller

Florida Dept. of Transp.

1970 35p 2refs
Report no. PB-199 781; RB-140

Prepared in cooperation with Bureau of Public Roads.

The project studies the effect of pavement texturing on increasing pavement skid resistance and maintaining adequate skid resistance under the influence of vehicular traffic. A secondary objective was evaluation of the effectiveness of the texturing patterns as a warning device to drivers by increasing vehicle vibration and noise. Two texture styles were tested on both bituminous and portland cement concrete pavement. All surfaces were textured by a special diamond studded cutter in a transverse pattern. The two-year study concluded that transverse pavement texturing was only slightly effective on portland cement concrete and ineffective on bituminous concrete pavements. Furthermore, the textural patterns utilized were not suitable as warning devices.

Search terms: Grooving; Pavement surface texture; Pavement skidding characteristics; Pavement skid resistance; Rumble strips; Vibration; Vehicle noise; Warning systems; Concrete pavements; Bituminous concrete pavements; Portland cements; Pavement wear; Pavement tests

AVAILABILITY: NTIS as PB-199 781

HS-011 164 Fld. 2/9

AUTOMATIC VEHICLE IDENTIFICATION SYSTEMS—METHODS OF APPROACH

by Albert S. Palatnick; H. Rudolf Inhelder

Published in *IEEE Transactions on Vehicular Technology* vVT-19 n1 p128-36 (Feb 1970)

9refs

The basic concept of an automatic vehicle identification system requires a vehicle-mounted coded device, a transponder, that uniquely identifies that vehicle. As the vehicle comes within the range of a system interrogator installed along or on the highway, the code is

2/9 Traffic Control (Cont'd.)

HS-011 164 (Cont'd.)

read. The ideal transponder is passive and requires no power; has no effect on and is not affected by the vehicle; does not require physical contact with the interrogator; and requires no action by the driver. Many sensing techniques have been investigated and analyzed to determine their applicability for an automatic vehicle identification system. It is concluded that a low frequency induction system is presently the most appropriate method for highway use. Several diverse systems using this basic technique have been constructed and tested.

Search terms: Automatic vehicle identification; Transponders; Coding systems; Sensors; Vehicle detectors; Automobile identification; Electromagnetic radiation; Frequency coding; Frequency modulation; Frequency shift keying; Pulse code modulation; Microwave systems; Optical detectors

HS-011 165 Fld. 2/9

AUTOMATIC VEHICLE GUIDANCE AND CONTROL—A STATE OF THE ART SURVEY

by Robert E. Fenton

Published in *IEEE Transactions on Vehicular Technology* vVT-19 n1 p153-61 (Feb 1970)

47refs

One practical system of future highway automation would consist of both automated and nonautomated roads, with only the main highways automated and dual mode vehicles used. This could evolve from the road system of today. The two major technical areas are the physical characteristics of the various required subsystems for vehicle guidance and control and the optimum operation of the overall highway system. The subsystems are divided into eleven categories: automatic longitudinal control, vehicle spacing detection, communication systems, automatic lateral control, automatic merging control, controlled lane changing, vehicle propulsion, system decision making capability, compatible manual mode, automatic vehicle checkout, and evolutionary developments. The role and state of the art of each category are discussed, together with interrelationships among categories.

Search terms: Automatic highways; Automatic control; Guidance systems; Vehicle control; Vehicle guidance; Vehicle spacing; Automatic headway control; Decision making; Dual mode vehicles; Lane changing; Vehicle detectors; Propulsion systems; Communication systems; Highway communication; Merging; Manual control; Control equipment; State of the art studies; Systems analysis

HS-011 166 Fld. 2/9; 4/3

ESTABLISHING PRIORITIES FOR THE INSTALLATION OF TRAFFIC CONTROL DEVICES: THE RAIL-HIGHWAY INTERSECTION EXAMPLE

by Hoy A. Richards; Donald L. Hooks

Published in *Highway Research Board Special Report* n107 p70-80 (1970)

4refs

Paper sponsored by the Committee on Highway Safety.

From a study of protective device installations at rail-highway intersections, a procedure is developed that establishes priorities for the improvement of safety at these intersections. Techniques are reported for computing installation and maintenance costs, prorated annually, of rail-highway traffic control devices. In addition, the benefit cost relationship is demonstrated. Intersections are ranked in descending order on the basis of the relationship between incremental benefits, or the reduction in accident costs, and incremental cost of additional protection.

Search terms: Benefit cost analysis; Railroad grade crossings; Priorities; Intersections; Traffic control devices; Accident costs; Accident location; Accident prevention; Warning systems

HS-011 167 Fld. 2/9

USE OF A RUMBLE STRIPE TO REDUCE MAINTENANCE AND INCREASE DRIVING SAFETY

by Roger Cahoon

Published in *Highway Research Board Special Report* n107 p89-98 (1970)

2refs

Sponsored by Committee on Traffic Control Devices.

Heavy traffic volume shortens the life of painted pavement markings, sometimes wearing them off within 30 days. A great deal of research has been done to produce better paint and reflective bead products. Different methods of marking pavement have also been investigated, the method best known being the raised traffic markers. California has used these for years and found them to have much better visibility and longer life than painted stripes, as well as producing a noise that warns a driver that he is moving outside of his traffic lane. The main trouble with raised traffic markers is that snowplows cut them off. For two years the Utah Department of Highways has been researching the possibility of recessing a design or texture to produce the same advantages as raised markers. Grooved painted stripes are recommended for areas where snow removal is necessary.

Search terms: Raised pavement markings; Reflectorized pavement markings; Pavement markings; Rumble strips; California; Utah; Snow plows; Snow removal; Grooving; Highway maintenance; Traffic volume; Pavement wear; Paints; Visibility; Service life

HS-011 168 Fld. 2/9; 4/7

THE OVERSATURATED SIGNALIZED INTERSECTION—SOME PROBABILISTIC ASPECTS

by Torbjorn Thedeen

Published in *Transportation Science* v3 n4 p289-96 (Nov 1969)

2refs

Statistical analysis of the structure of headways at the passage of an oversaturated signalized intersection has suggested the hypothesis that these headways are independent random variables. In this paper a simple model is considered: let the spacings and reaction times of the vehicles stopped at the intersection all be independent and let the trajectory relative to the start position and start time be the same for all stopped vehicles. It is shown that the headways at the intersection are independent if, and only if, this trajectory is linear in a certain region specified in the paper.

Search terms: Statistical analysis; Probability theory; Time headways; Distance headways; Signalized intersections; Variables; Traffic capacity; Traffic models; Vehicle trajectories; Mathematical models

HS-011 169 Fld. 2/9

TRAFFIC TROUBLES AND SOLUTIONS IN THE ARGENTINE REPUBLIC

by Armando Garcia-Baldizzone

Published in *Traffic Engineering* v40 n3 p42-7 (Dec 1969)

Traffic problems in Buenos Aires have reached alarming levels since 1960, after much growth in the automotive industry and in motor vehicle registration. Integral solutions are under study; steps taken include use of many one-way streets, arterial signal coordination, and improvement projects on existing highways. Urban and rural traffic has been surveyed; traffic count techniques are described. Origin and destination studies are discussed. To determine traffic growth, a model based on the gross national product was devised.

Search terms: Traffic congestion; Traffic volume; Traffic management; Argentina; Buenos Aires; Rural highways; Origin and destination studies; One way traffic; Vehicle registration; Signalized intersections; Highway improvements; Traffic signal coordination; Traffic survey devices; Traffic models

3/0 HUMAN FACTORS

3/1 Alcohol

HS-011 170 Fld. 3/1

THE EFFECT OF ALCOHOL ON SENSORY PHENOMENA AND COGNITIVE AND MOTOR TASKS

by Evan G. Lewis; Robert E. Dustman; Edward C. Beck

Published in *Quarterly Journal of Studies on Alcohol* n3 p618-33 (1969)

50refs

Four tests calling for cognitive and motor skills were administered to examine performance after small and moderate doses of alcohol. Sensory phenomena, visual responses, and somatosensory evoked responses were examined. Performance at varying blood alcohol levels is described. Aspects discussed include critical flicker fushion, pulse rate, and spiral aftereffect of alcohol.

Search terms: Perception; Alcohol effects; Laboratory tests; Vision tests; Blood alcohol levels; Heart rate; Motor skills; Critical flicker fusion; Visual perception; Flicker frequency; Visual behavior; Color perception

HS-011 171 Fld. 3/1

ALCOHOL IN RELATION TO HIGHWAY SAFETY

Anonymous

Published in *Medico-Legal Bulletin* v217 p1-5 (May 1971)

Reputable scientific evidence has established that the misuse of alcohol is by far the largest single factor contributing to highway crashes. The issue is how to prevent drinking drivers from driving. The driving ability of all individuals is impaired at blood alcohol concentrations of 0.10% and higher; many are impaired as low as 0.05%. Drivers with high blood alcohol levels have much higher statistical probabilities of being involved in accidents, and studies of fatally injured drivers have shown that alcoholics are highly overinvolved in accidents. Research being carried out on the drinking driver problem is described.

Search terms: Drinking drivers; Driver intoxication; Blood alcohol levels; Alcohol effects; Alcohol usage deterrents; Fatalities; Alcoholism; Problem drivers; Accident rates; Accident risks; Driver performance

HS-011 172 Fld. 3/1

VEHICLE VIOLENCE: AN AMERICAN TRAGEDY

by Robert B. Voas

National Hwy. Traf. Safety Administration

Published in *MRI Quarterly* p4-11 (Fall 1971)

24refs

Alcohol is a major contributor to violent death of all types. The relationship between alcohol and highway crashes is discussed. Aspects included are: suicide by vehicle; blood alcohol levels of drivers found at fault in accidents; drinking

3/1 Alcohol (Cont'd.)

HS-011 172 (Cont'd.)

patterns of male and female drivers; problem drinkers; poor enforcement of laws against drunk driving; degree of impairment caused by various amounts of alcohol.

Search terms: Violence; Drinking drivers; Driver intoxication; Suicide by vehicle; Blood alcohol levels; Male drivers; Female drivers; Problem drivers; Alcohol laws; Accident responsibility; Law enforcement; Driver performance; Driver physical fitness; Alcoholism; Alcohol effects; Accident causes

3/2 Anthropomorphic Data

HS-011 173 Fld. 3/2

HUMAN REACTION TO VIBRATION

by Geoff Allen

Published in *Journal of Environmental Sciences* v14 n5 p10-5 (Sep-Oct 1971)

21refs

Presented at Institute of Environmental Sciences annual meeting, Los Angeles, 26-30 Apr 1971.

Externally induced body vibration and some of the reactions it produces are discussed. Confusion in the results of many investigations into human reaction to vibration is illustrated and briefly discussed. The International Standards Organization proposed limits for vibration exposure are reviewed. Variables involved in a vibration test of the complex, multi-system human are analyzed. A qualitative equation is presented, covering some of the many physical, physiological, and psychological variables involved. Ways of improving knowledge of the subject are suggested, especially better standards of experimentation and the need for more real life investigations.

Search terms: Vibration; Sinusoidal vibration tolerances; Motion effects; Biodynamics; Laboratory tests; Vibration analysis; Tolerances (physiology); Psychological factors; Human body; Man machine systems; Driver vehicle interface; Fatigue (biology); Visual acuity; Comfort; Equations; Reviews

3/5 Driver Education

HS-011 174 Fld. 3/5; 3/4

DRIVER TRAINING FOR EMERGENCY SITUATIONS

by Albert Zavala; Robert C. Sugarman; Roy S. Rice

Cornell Aeronautical Lab., Inc.

1972 6p 20refs
Report no. SAE-720144

Presented at the Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The value and need for the simulation of driver information processing and control functions are discussed, emphasizing the relevance of simulation to the practical utility of accident reduction. Accident rate study findings, results of manual control studies, and psychomotor performance skills research are reviewed. Most drivers, even when learning to drive, already know how to operate each of the controls, switches, and pedals, but do not know the proper sequence. The psychomotor skills of most drivers are adequate under routine conditions but deteriorate under stresses of speed, accuracy, task load, and information load. The overlearning of emergency driving skills is thus important. Driving simulators should be used to train specific population groups such as police officers and high school students in specific control tasks and emergency driving conditions as well as routine conditions.

Search terms: Driver emergency responses; Driver skills; Driver behavior research; Driver education; Driver performance under stress; Driver experience; Accident rates; Driver errors; Driver reaction time; Emergency training; Perceptual loads; Loading (operator performance) Driving simulators; Manual control; Psychometrics; Motor skills; Driving tasks; Police training; High school drivers; Simulation models; Information modeling

AVAILABILITY: SAE

HS-011 175 Fld. 3/5

CURRENT RESEARCH IN DRIVER EDUCATION

by William E. Tarrants

National Hwy. Safety Bureau

Published in *Highway Research Board Special Report* n107 p34-40 (1970)

9refs

Paper sponsored by Committee on Road User Characteristics.

The effectiveness of driver education as an accident countermeasure has been questioned. Short and long term evaluation plans are suggested. The short term plan includes driving task analysis, objectives of driver education, evaluation of program content, and specifications for long term evaluation. The long term plan includes measures of driver performance, program characteristics, and highway traffic system objectives, and research studies using proximate and ultimate criteria.

Search terms: Driver education evaluation; Driving task analysis; Driver performance; Accident prevention

3/6 Driver Licensing

HS-011 176 Fld. 3/6

THE DRIVER LICENSE ADMINISTRATOR—DOCTOR, LAWYER, LICENSE CHIEF!

by Louis P. Spitz

Published in *Traffic Quarterly* v25 n4 p575-85 (Oct 1971)

Driver licensing administrators rely increasingly upon the participation of the medical and legal professions to assist in making value judgments on the medical and legal competence of drivers. Medical aspects of driver licensing discussed are physical fitness, mental fitness, alcohol misuse, vision problems. Legal aspects of driver licensing discussed include computerization of driver records and the removal of minor traffic offenses from the criminal code.

Search terms: Driver licensing; Driver license standards; Driver physical fitness; Driver mental fitness; Drinking drivers; Problem drivers; Driver records Traffic law violations; Legal factors; Disability evaluation; Medical advisory boards; Computerized driver records; Driver vision standards; Vision disorders

3/7 Drugs Other Than Alcohol

HS-011 177 Fld. 3/7

THE DRUG ABUSER AS A SAFETY HAZARD

by David Sohn

Published in *ASSE Journal* v16#11 p12-6 (Nov 1971)

17 refs

Presented at Occupational Health and Safety Seminar, New York City, 22 Mar 1971.

Drug abusers represent a significant safety hazard. Statistics regarding the problem are presented, especially relating to individual employment and driving accident rates in New York State. There are 120,000 heroin addicts in New York City alone, and these constitute one out of every 10 persons in the 16-24 age group. Heroin addicts have four times the accident rate of other drivers. Marijuana affects motor and mental performance adversely. The effects of stimulants and hallucinogens are discussed. Programs for detecting drug abusers are badly needed. It is suggested that all job applicants be tested for drug abuse. Of 1,200 heroin addicts whose driving records were studied, none had ever been convicted for driving while under the influence of drugs, which shows the failure of present detection methods.

Search terms: Drug addiction; Problem drivers; Accident repeater drivers; Accident rates; New York (City); New York (State); Young adults; Adolescents; Heroin; Stimulants; Hallucinogens; Marijuana; Drug effects; Physical examinations

3/12 Vision

HS-011 178 Fld. 3/12

NONENCUMBERING VISUAL PERFORMANCE MEASUREMENTS

by Philip W. Davis; Jonathan S. Lutz; Andrew Warner

Department of Transp., Transp. Systems Center

1972 9p 4refs
Report no. SAE-720140

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Instrumentation has been developed to track and record dynamically an automobile driver's voluntary and involuntary eye motions with no encumbrance to the driver's head or eye. This portable eye-tracking system makes possible field studies of the driver's angle of gaze referenced to the scene; involuntary eye motions as possible indications of physiological state (fatigue, intoxication, etc.); and pupil response.

Search terms: Mathematical analysis; Optical detectors; Eye movements; Dynamic tests; Involuntary blinking; Flicker frequency; Pupil responses; Driver fatigue; Tracking; Measuring instruments; Drinking drivers; Field of view

AVAILABILITY: SAE

5/0 VEHICLE SAFETY

5/2 Buses, School Buses, and Multipurpose Passenger Vehicles

HS-011 179 Fld. 5/2

SAFER SCHOOL BUSES—AN INDUSTRY-WIDE EFFORT

Anonymous

Published in *School Bus Fleet* v16 n5 p22, 24, 26-30 (Oct-Nov 1971)

The safety programs of various school bus manufacturers are discussed, emphasizing the program of the Wayne Corporation. Laboratory and road tests of the bus body and its components are described. The policy is to surpass safety standards whenever possible. Structural integrity and ease of maintenance are discussed.

Search terms: Manufacturing standards; Safety standards compliance; Crashworthy bodies; Bus maintenance; School bus design; School bus bodies; School bus safety; School bus standards; Safety programs; Laboratory tests; Bus tests; Bus safety standards

5/4 Design

HS-011 180 Fld. 5/4

PROPERTIES OF SILICONE AND ORGANIC ELASTOMERS, AS MEASURED AT HIGH TEMPERATURES

by A. L. Machek; J. T. McIntyre

Dow Corning Corp.

1972 10p 2refs
Report no. SAE-720128

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The high-temperature properties of silicone rubber are compared to those of six organic rubbers. Of the seven rubbers tested, only silicone rubber retains elastomeric properties at temperature after a four-hour exposure to 437°F. New data on properties at temperature, as distinct from standard heat aging data, are presented to guide the designer and materials engineer. The properties of fluorosilicone rubber are also discussed. Current automotive applications of both silicone rubber and fluorosilicone rubber are described.

Search terms: Rubber; Silicone rubbers; Thermodynamic properties; Temperature endurance tests; Synthetic rubber; Automobile materials; Tensile strength; High temperature

AVAILABILITY: SAE

HS-011 181 Fld. 5/4

SOME FACTORS AFFECTING THE COLD PUMPABILITY OF CRANKCASE OILS

by R. M. Stewart; C. R. Spohn

Gulf Res. and Devel. Co.

1972 15p 4refs
Report no. SAE-720150

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The cold pumpability characteristics of a group of commercial premium crankcase oils were evaluated at 0 and −20 F in a test standard engine. A test procedure was developed for these evaluations which gave results that compared favorably with those obtained in two popular makes of test cars at 0 F. In a second, more detailed, phase of this study, the effects of fourteen factors on the cold pumpability of several crankcase oils were investigated. The data from both phases were then analyzed to determine if an oil's cold pumpability in an engine could be predicted from its CCS viscosity, Brookfield viscosity, GM pour time, or ASTM pour point.

Search terms: Lubricating oils; Viscosity; Low temperature fluidity; Cold weather tests; Physical properties; Laboratory tests; Lubricating oil tests; Rocker arms; Crankcases; Engine speeds; Fluid flow; Multigrade oils; Oil pumps

AVAILABILITY: SAE

HS-011 182 Fld. 5/4

FLOW PROPERTIES OF HYPOID GEAR LUBRICANTS AT SUB-ZERO TEMPERATURES

by Donald L. Powell

AutoResearch Labs., Inc.

1972 14p 6refs
Report no. SAE-720151

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Tests were conducted throughout the temperature range of −65–0 F with a truck axle equipped with observation windows and temperature-measuring equipment. Twenty-one test lubricants encompassing a wide range of physical properties were employed in the investigation. Based upon this study, the flow characteristics of satisfactory sub-zero gear lubricants have been identified. Correlations of the truck axle flow results with several commonly specified tests for fluidity were attempted and discussed. The development of a small axle flow simulator is described, and its correlations with full-scale axle flow results are discussed.

Search terms: Lubricating oil tests; Cold weather tests; Low temperature fluidity; Fluid flow; Physical properties; Gears; Axles; Truck performance; Laboratory tests; Test equipment; Viscosity

AVAILABILITY: SAE

HS-011 183 Fld. 5/4

DEVELOPMENT OF A VARIABLE-SEVERITY SCORING TEST FOR HYPOID GEAR LUBRICANTS

by Arnold E. Schenk; Donald L. Powell; H. Ruwe Barton

AutoResearch Labs., Inc.

1972 13p 2refs
Report no. SAE-720152

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The presently used laboratory hypoid gear scoring tests are described and the deficiencies are noted. The inadequacies of these tests led to the development of a test device and a procedure designed to evaluate gear lubricants more accurately. An account of the development of the test system with the cooperation of the Coordinating Research Council, Inc. is given. The unique design features of the gearbox and the test gears are described. An account is given of the steps in the test development and the use of the CRC reference oils in this development. The test is capable of evaluating the scoring resistance of hypoid gear oils covering a range of performance levels from RGO 104 to RGO 110. Data on repeatability are presented.

Search terms: Lubricating oils; Lubricating oil tests; Test equipment; Gear boxes; Gears; Performance tests; Dynamometers; Gear teeth

AVAILABILITY: SAE

HS-011 184 Fld. 5/4; 4/7

A MORE COMPLETE ANALYSIS OF UNSTEADY GAS FLOW THROUGH A HIGH-SPECIFIC-OUTPUT TWO-CYCLE ENGINE

by G. P. Blair; W. L. Cahoon

Queen's Univ. of Belfast (Northern Ireland)

1972 15p 9refs
Report no. SAE-720156

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The performance characteristics of a naturally aspirated two-cycle engine can be predicted with an unsteady gas dynamics analysis of flow through the crankcase and cylinder; such an analysis provides values of volumetric efficiency and trapping pressure at any given engine speed. The predictions of the volumetric efficiency and trapping pressure are compared with experimental values from a high-specific-output engine and further amplified with theoretical/experimental comparisons of pressure-time histories taken in the exhaust, transfer, and inlet systems at several engine speeds. The theoretical derivation of unsteady gas dynamic cylinder to pipe boundary conditions is presented so that they become both economical of computer time and mathematically stable.

Search terms: Gas motion; Two stroke cycle engines; Test equipment; Equations; Engine performance; Gas dynamics; Mathematical analysis; Mathematical models; Pressure time histories; Engine speeds; Computerized simulation

AVAILABILITY: SAE

HS-011 185 Fld. 5/4

DEVELOPMENT OF A HIGH-TEMPERATURE SENSOR FOR A GAS TURBINE ENGINE

by Robert F. Sullivan

General Motors Corp.

1972 10p
Report no. SAE-720160

Presented at the Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A reliable high-temperature thermocouple for sensing turbine inlet temperature of a gas turbine engine has been developed. This sensor employs noble-metal thermoelements but retains the high signal level associated with base-metal thermocouples. A unique system of secondary junctions, contained within the device itself, allows transition to relatively inexpensive standard thermocouple materials. The development of different sampling type protective probes, including an air-cooled design, accompanied the development of the thermoelements. Some of the unsuccessful as well as the successful steps in the development are discussed, and some thoughts on future temperature sensors are given.

Search terms: Sensors; Gas turbine engines; High temperature; Thermocouples; Metals; Alloys; Precious metals

AVAILABILITY: SAE

HS-011 186 Fld. 5/4

'DEFLECTOR KEEPS ENGINE OUT OF COMPARTMENT IN 60 MPH CRASH

by William Flanagan

Published in *Automotive Engineering* v79 n11 p19-23 (Nov 1971)

A fixed ramp on a reinforced firewall will deflect the engine and transmission below the passenger compartment during frontal barrier impacts while the car body rides up and over. Four sedans were impacted at 60 mph to study the concept of engine deflection. The worst damage to any compartment was a rip in the floorpan from a grazing blow by the engine. Structural changes to the frame and firewall would enable a crashworthy body with B pillars connected at the roof to withstand 60 mph impacts into fixed objects.

Search terms: Engine deflection; Sliding ramps; High speed impact tests; Crashworthy bodies; Body design; Fire walls; Frame design; Passenger compartments; Vehicle fixed object collisions; Barrier collision tests; Transmissions

HS-011 187 Fld. 5/4

RESPONSIBLE CONCERN FOR SAFETY

by William V. Luneburg

Published in *Traffic Quarterly* v25 n4 p521-31 (Oct 1971)

The history of the highway safety movement is outlined. The increasing emphasis on safety in vehicle design is discussed. The evolution of automobile design since 1900 is described.

Search terms; History; Safety design; Automobile design; Highway safety

HS-011 188 Fld. 5/4

EQUIPMENT FOR PROPELLING VEHICLES TO THE CRASH BARRIER AND FOR EXTRACTING TEST RESULTS

by C. H. G. Mills

Published in *MIRA Bulletin* n2 p6-10 (Mar/Apr 1968)

An indoor British facility for impact tests is described, including method of propulsion, control gear, and electronic

5/4 Design (Cont'd.)

HS-011 188 (Cont'd.)

equipment. A linear induction motor has been found most satisfactory for accelerating the car in the shortest possible distance, thus saving building costs. The design of the motor, its power supply and control gear, and the safety features and instrumentation of the facility are discussed.

Search terms: Electronic devices; Impact tests; Measuring instruments; Acceleration; Linear induction motors; Propulsion systems; Test equipment; Research facilities; Great Britain

5/6 Fuel Systems

HS-011 189 Fld. 5/6

VALVE TIMING FOR CONTROL OF OXIDES OF NITROGEN (NO_x)

by Max A. Freeman; Roy C. Nicholson

General Motors Corp.

1972 15p 7refs
Report no. SAE-720121

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Three engine camshaft approaches to the reduction of oxides of nitrogen were investigated: increased valve overlap, variable camshaft timing, and variable valve overlap. The interaction of these systems with emissions, fuel consumption, and power was evaluated on a dynamometer engine. The effects of air-fuel ratio and exhaust backpressure were also reported. Results of the dynamometer study were verified with vehicle tests. Oxides of nitrogen levels of 1.2-2.0 g/mile were attained through camshaft design with acceptable drivability on the 1970 federal test procedure.

Search terms: Nitrogen oxides; Camshafts; Dynamometers; Valve timing; Power output; Fuel consumption; Engine operating conditions; Exhaust emission tests; Air fuel ratio; Mathematical models

AVAILABILITY: SAE

HS-011 190 Fld. 5/6

EVALUATION OF GASEOUS FUELS FOR AUTOMOBILES

by Stanley L. Genslak

General Motors Corp.

1972 15p 10refs
Report no. SAE-720125

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

An evaluation of gaseous fuels was made to determine their capability in reducing emissions from automobiles. The four-part program included tests of propane (LPG) and natural gas in a dynamometer engine (phase one) and in a car parameter study (phase two). Power and spark requirements were compared with those of gasoline on the dynamometer engines. Emissions, economy, performance, and drivability were evaluated on the cars; and air-fuel ratio, spark advance, and exhaust gas recirculation served as variable parameters. The third phase of the program determined the low-emission capability of an LPG car with proposed emission hardware. The economy, performance, and drivability at these low levels were obtained. The final phase tested a dual-fuel car to evaluate the feasibility of using LPG to start and warm up the car, followed by an automatic switch to gasoline. The emissions, drivability, and the LPG fuel consumption were recorded.

Search terms: Propane; Liquefied petroleum gases; Liquefied petroleum gas automobiles; Natural gas; Natural gas automobiles; Parameters; Fuel quality; Driveability; Fuel consumption; Exhaust gas recirculation; Power loss; Exhaust emission control; Gasoline quality; Fuel economy; Air fuel ratio; Spark timing; Exhaust emission control devices; Dual fuel vehicles; Dynamometers; Coldstarts; Engine speeds; Power output

AVAILABILITY: SAE

HS-011 191 Fld. 5/6; 2/7

THE CLEAN AIR ACT—WHERE ARE WE? WHERE ARE WE GOING? HOW ARE WE GOING TO GET THERE?

by Eric O. Stork

Environmental Protection Agency

1972 5p
Report no. SAE-720127

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The implementation of Title 2 of the Clean Air Act is described, with special emphasis on the emission standards and test procedures for 1975 and 1976 light-duty vehicles. Discussed are the new test procedure to measure an average car's emissions, and the EPA's tests and analysis—particularly the baseline study of emissions from 1971 cars—which became the basis for setting the new standards. The complex control systems needed to meet 1975 standards will probably require more maintenance than those now in use. If requirements are reasonable, EPA expects to allow more maintenance on durability vehicles than the currently applicable regulations allow. Assembly-line testing will be based on average emissions from production cars, and will ensure that cars with excessively high emissions will not be sold. As soon as procedures are established for testing emissions from vehicles in use, manufacturers will be required to repair at their expense any vehicle that fails such tests, or to recall and repair any class of vehicle that does not conform to applicable standards.

Search terms: Exhaust emission control; Clean Air Act of 1970; Exhaust emission standards; Exhaust emission control device maintenance; Compliance; Air pollution control

AVAILABILITY: SAE

HS-011 192 Fld. 5/6

SOUND PRESSURE LEVELS GENERATED BY INTERNAL COMBUSTION ENGINE EXHAUST SYSTEM

by G. P. Blair; J. A. Spechko

Queen's University of Belfast (Northern Ireland); Rupp Industries, Inc.

1972 12p
Report no. SAE-720155

Presented at the Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A computer program has been developed which predicts the sound pressure level and the frequency spectrum produced by simple engine exhaust systems. The program utilizes unsteady flow gas dynamic theory to predict the pressure-time history in the exhaust system and the velocity-time history at the open end of the system. Acoustic theory is then used to predict the sound pressure levels and frequency spectrum in free space. The work was carried out on a twin-cylinder four-cycle engine, but the theory can be applied to any internal combustion engine.

Search terms: Internal combustion engines; Exhaust noise; Computerized simulation; Pressure time histories; Test equipment; Engine speeds; Gas dynamics

AVAILABILITY: SAE

HS-011 193 Fld. 5/6

THE ASSIGNMENT OF RESPONSIBILITY FOR AIR POLLUTION

by L. S. Caretto; R. F. Sawyer

San Fernando Valley State College; California Univ., Berkeley

1972 8p 12refs
Report no. SAE-720165

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A simple method of weighting emissions data to provide a relation between source mass emissions and the resulting impact on air pollution is proposed. The importance of the following factors are considered: chemical severity of the pollutant species, source effectiveness, population exposure, and area severity. The selection of these factors is described with particular attention to the obtaining of chemical severity factors from air quality standards. Qualifications upon the use of this weighting scheme are outlined. Application to the Los Angeles and San Francisco bay areas show that weighted emissions of transportation sources are less than their mass emissions, while weighted emissions of all other pollutant sources are greater than their mass emissions. In both cases, transportation remains the dominant pollution source category.

Search terms: Air pollution emission factors; Vehicle air pollution; Air quality standards; Los Angeles; San Francisco; Air pollution sources; Emissions; Air pollution measurement; Air pollution research; Mathematical analysis; Chemical reactions

AVAILABILITY: SAE

HS-011 194 Fld. 5/6; 4/8

A METHOD FOR ESTIMATING AND GRAPHICALLY COMPARING THE AMOUNTS OF AIR POLLUTION EMISSIONS ATTRIBUTABLE TO AUTOMOBILES, BUSES, COMMUTER TRAINS, AND RAIL TRANSIT

by Jerold W. Scheel

General Motors Corp.

1972 13p 22refs
Report no. SAE-720166

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

An analytical method is described for estimating and graphically comparing the amounts of mass emissions from autos, buses, commuter trains, and rail transit, expressed in "grams per person mile" and "grams per vehicle mile" in order to consider their quantity based on the movement of people as well as vehicles. Emissions considered include carbon monoxide, hydrocarbons, nitrogen dioxide, and sulfur dioxide. The relative effects of these pollutants are also presented. The method can be used to estimate the quantity of emissions produced in a specified area, given the travel characteristics of that area. Application of the method can help local officials estimate the effects of various transportation policies on the regional transportation-related pollution. Estimated changes in travel habits can be related in advance to the impact of various transportation policies and the amount of emissions in a given region.

Search terms: Travel patterns; Modal choice; Vehicle air pollution; Air pollution emission factors; Carbon monoxide; Hydrocarbons; Nitrogen dioxide; Sulfur dioxide; Transportation planning; Regional planning; Environmental planning; Environmental research; Vehicle mileage; Commuting patterns; Automobiles; Buses; Public transportation; Rail transportation; Emissions; Graphic techniques; Forecasting; Air pollutants; Mathematical models; Mathematical analysis

AVAILABILITY: SAE

HS-011 195 Fld. 5/6; 5/11

MAINTAINING VACUUM-OPERATED EMISSION CONTROLS

5/6 Fuel Systems (Cont'd.)

HS-011 195 (Cont'd.)

by Robert Taylor

Published in *Motor Service* p70, 72, 74-6 (Oct 1971)

Most emission control systems use vacuum operated diaphragms or valves. Operation of recent model systems is explained: heated air intake, antibackfire valve, cleaner air package, evaporative control, dual vacuum-advance ignition, and other vacuum operated controls.

Search terms: Exhaust emission control; Evaporative emission control; Exhaust emission control device maintenance; Exhaust emission control devices; Vacuum operated equipment

HS-011 196 Fld. 5/6

EXHAUST EMISSION LEGISLATION

by Allan Aitken

Published in *Journal of Automotive Engineering* v2 n7 p9-13 (July 1971)

Great Britain has a new governmental laboratory to carry out 15,000 emission tests a year for every market in the world. Some 140 variants of British car engines have been developed for sale in countries with different emission legislation. The emission test procedures of the Common Market countries, European countries outside the Common Market, the United States, and Canada are listed, together with the requirements which must be met.

Search terms: Laboratory tests; Great Britain; Exhaust emission tests; Europe; United States; Canada; Exhaust emission standards; Emission standards; Emission tests; Crankcase emissions; Leaded gasoline; Hydrocarbons; Carbon monoxide; Nitrogen oxides

HS-011 197 Fld. 5/6

HOW CLEAN A CAR?

by John B. Heywood

Published in *Technology Review* v73 n8 p20-9 (June 1971)

The nature of the air pollution problem from vehicle emissions is described. The three major pollutants are hydrocarbons, carbon monoxide, and nitrogen oxides. The ways in which they are formed in the internal combustion engine are discussed, including the influence of fuel air ratio and various engine operating conditions. The establishment of emission standards and the problems of emission testing are described. The federal standards on emissions which will go into effect in 1975 do not allow enough time to develop alternative power plants on a massive scale. Emphasis will probably be on the development of a cleaner car still using a spark ignition engine.

Search terms: Exhaust emission control; Exhaust emission standards; Exhaust emission tests; Air pollution emission factors; Vehicle air pollution; Hydrocarbons; Carbon monoxide; Nitrogen oxides; Internal combustion engines; Propulsion systems; Spark ignition engines; Lead time; Engine operating conditions; Air fuel ratio

HS-011 198 Fld. 5/6

NATIONAL AIR QUALITY STANDARDS FOR AUTOMOTIVE POLLUTANTS—A CRITICAL REVIEW

by J. M. Heuss; G. J. Nebel; J. M. Colucci

Published in *Journal of the Air Pollution Control Association* v21 p535-48 (Sep 1971)

73refs

Presented at 64th annual meeting of Air Pollution Control Association, Atlantic City, Jun 1971. Includes discussion by Delbert S. Barth, J. Cyril Romanovsky, John H. Knelson, Aubrey P. Altshuller, and Robert J. M. Horton.

Air quality standards are examined for four automotive-related pollutants: carbon monoxide, nitrogen dioxide, hydrocarbons, and photochemical oxidants. It is concluded that the standards are more restrictive than can be supported by available data, and that less restrictive standards would adequately protect the public health and welfare. The health hazards of these pollutants are described. The review is critical of the Environmental Protection Agency for setting unreasonable standards. The discussion, by members of the Environmental Protection Agency, defends the standards and contends that protective action should be taken before, not after, air pollution is proved to be hazardous to health.

Search terms: Air quality standards; Vehicle air pollution; Air pollution emission factors; Air pollution sources; Air pollution research; Air pollution effect on health; Health hazards; Environmental Protection Agency; Carbon monoxide; Nitrogen dioxide; Hydrocarbons; Photochemical oxidizers; Air pollution control

HS-011 199 Fld. 5/6

1972 EMISSIONS CURBS MET

by Ralph H. Eshelman

Published in *Automotive Industries* v145 n9 p39-44, 63 (1 Nov 1971)

The certification of 1972 model cars to government emission standards will be difficult. It is suggested that 1975-76 standards are so impractical and uneconomic that they will have to be tempered before their deadlines. The lead time and engineering problems of emission control are discussed. Some

typical emission control devices of 1972 model cars are described.

Search terms: Exhaust emission control devices; Exhaust emission standards; Emission standards; Lead time; Automobile models; Exhaust emission control device certification; Automobile certification

5/9 Inspection

HS-011 200 Fld. 5/9; 5/20

PRE-TRIP INSPECTIONS: VITAL ARM OF THE SAFETY TRIANGLE

by Dick Cross; Ed Shea

Published in *Commercial Car Journal* v122 n3 p94-101 (Nov 1971)

Three aspects of a truck fleet safety program are pre-trip inspections, safety lane checks, and the cooperation of the maintenance and operations departments. To cut breakdowns and accidents due to mechanical failure requires a total fleet effort. A defective vehicle must never be dispatched because management ignores the risk. The total effort also includes the driver. Even when a safety lane exists, pre-trip inspections constitute a vital check against putting dangerous equipment on the road. The truck safety situation is so critical that nearly one out of every four trucks inspected at a government road check is ordered out of service as being imminently hazardous. Many truck drivers have not been taught to recognize defects.

Search terms: Truck drivers; Truck defects; Defective vehicles; Safety programs; Fleet management; Truck maintenance; Fleet safety; Inspection lanes; Inspection procedures; Vehicle inspection; Inspection standards

5/10 Lighting Systems

HS-011 201 Fld. 5/10

THE REFLECTORISATION OF MOTOR VEHICLE REGISTRATION NUMBER PLATES

by Lucien Estival

Published in *International Road Safety and Traffic Review* v12 n1 p25-8 (Winter 1964)

The advantages of improved legibility of reflectorized license plates are described. The license plates commonly used in Europe have black characters on a white background, white characters on a black background, or red characters on a white background. A white background gives the best results. Reflectorized plates have about the same qualities of legibility as ordinary plates by day, but at night they are more legible on both moving and stationary vehicles. The successful use of reflectorized plates in France is discussed, and their use is recommended for other countries.

Search terms: Reflectorized license plates; License plates; Europe; France; Legibility; Visibility; Color coding; Contrast; Night visibility

5/15 Propulsion Systems

HS-011 202 Fld. 5/15

THE FORD TURBINE—AN ENGINE DESIGNED TO COMPETE WITH THE DIESEL

by R. G. Cadwell; W. I. Chapman; H. C. Walch

Ford Motor Co.

1972 20p 6refs
Report no. SAE-720168

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

This paper describes the design of the Ford gas turbine engine. The discussion includes basic design parameters, mechanical arrangement, functional and material requirements, and the aerodynamic and mechanical design of the major components and associated systems. Component and engine test results are discussed briefly, together with some of the major problems encountered and their solutions.

Search terms: Gas turbine engines; Engine tests; Engine design; Engine performance; Engine operating conditions; Diesel engines; Aerodynamic configurations

AVAILABILITY: SAE

HS-011 203 Fld. 5/15

TRANSMISSION CONSIDERATIONS FOR GAS TURBINES

by Robert J. Dorgan; John M. Nolan; Russell L. Rio

General Electric Co.

1972 6p 6refs
Report no. SAE-720169

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The effects of transmission selection on the performance and fuel economy of a gas turbine powered automobile are analyzed. Both single-shaft and two-shaft turbines are considered. Examples are given of fuel economy for an urban cycle, and performance of these engines with an infinitely variable transmission and with a power shift automatic transmission. The primary conclusions are that the infinitely variable transmission is necessary for a single-shaft engine and highly desirable for a two-shaft engine, and the use of an infinitely variable transmission with the single-shaft turbine eliminates any need for the wider output speed range of a two-shaft engine.

5/15 Propulsion Systems (Cont'd.)

HS-011 203 (Cont'd.)

Search terms: Gas turbine engines; Gas turbine automobiles; Engine performance; Fuel economy; Transmissions; Automatic transmissions; Engine speeds; Shafts

AVAILABILITY: SAE

HS-011 204 Fld. 5/15

THE DEVELOPMENT OF SILICON NITRIDE TO ACHIEVE HIGHER INLET TEMPERATURES IN LAND BASED GAS TURBINES

by R. J. Lumby; R. F. Coe; D. J. Lines

Lucas (Joseph) North America, Inc.

1972 12p 30refs
Report no. SAE-720170

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The introduction of the gas turbine engine into automotive transport will depend, to some extent, on the achievement of an efficient working cycle. Implicit in this requirement is the operation of the turbine at inlet temperatures in excess of 1500 K where metallic alloys have insufficient strength and corrosion resistance. Of the ceramic materials being considered for this environment, silicon nitride is the most attractive because of its low coefficient of thermal expansion, good thermal shock resistance, and high strength at these temperatures. The techniques and processes used in the production of reaction-bonded and hot-pressed silicon nitride are sufficiently advanced to enable predictions of material costs to be made. Consistent material is now available with well-established physical properties and having potential for further development.

Search terms: Gas turbine engines; Thermal factors; Engine operating conditions; Heat resistance; High temperature; Operating temperature; Alloys, Corrosion resistance; Ceramics; Silicon nitride; Physical properties; Mechanical properties; Thermodynamic properties

AVAILABILITY: SAE

HS-011 205 Fld. 5/15; 5/6

AUTOMOBILE VS. CLEAN AIR

by Bruce S. Schwartz

Published in *Technology Review* v73 n3 p20-9 (Jan 1971)

1ref

The 1970 Clean Air Car Race is discussed. The 42 low-pollution vehicles consisted of electric, electric-hybrid, gas turbine, and conventional vehicles modified to reduce emissions. The cars drove from the M.I.T. campus to the Pasadena campus of the California Institute of Technology. Most of the cars were built by high school and college students and were meant to demonstrate the feasibility of non-polluting cars. The technological, political, and publicity problems of the race and of non-polluting vehicle design are discussed. It is suggested that if students can build non-polluting cars, the automotive industry could do so.

Search terms: Air pollution emission factors; Vehicle air pollution; Propulsion systems; Exhaust emission control devices; Hybrid automobiles; Gas turbine automobiles; Electric automobiles; Engine modification; Automobile modification; Racing automobiles; Automobile design; Automotive industry general attacks; Mass media; Political factors

HS-011 206 Fld. 5/15

CLEAN AIR CAR RACE—THE WORCESTER GREMLIN KVA-SST

by Charles W. Beardsley

Published in *IEEE Transactions on Vehicular Technology* vVT-20 n2 p18-23 (May 1971)

In the 1970 Clean Air Car Race, 42 low-emission vehicles drove from M.I.T. to the California Institute of Technology in Pasadena. Two vehicles tied for first place in the electric-hybrid category, the vehicles from the University of Toronto and from Worcester Polytechnic Institute. The WPI car used an internal combustion engine running on unleaded gas in combination with a battery powered drive system. This car's problems during the race included: several burnouts of the solid-state controller; a fire on the second day of the race; overheating of the heat sinks on the rectifiers while crossing the desert; insufficient power of the electric motor to drive the car up steep grades. However, the race proved that cleaner cars are feasible.

Search terms: Air pollution emission factors; Vehicle air pollution; Internal combustion engines; Lead free gasoline; Electric automobiles; Hybrid automobiles; Engine modification; Drive systems; Automobile power; Vehicle fires; Heat sinks; Rectifiers; Overheating; Mountain driving; Racing automobiles; Heat tolerances; Control equipment

HS-011 207 Fld. 5/15

NEW BREED OF ENGINES: THE WANKEL AND THE TURBINE

by Tony Grey

Published in *Commercial Car Journal* v122 n3 p105-9 (Nov 1971)

Two new power plants are in limited production now, the Wankel and the gas turbine, and may be used in some fleets in the near future. Their advantages over conventional power plants are described, together with the problems connected with them. Aspects of engine performance discussed include emissions, air fuel ratio, operating speeds, and durability.

Search terms: Gas turbine engines; Wankel engines; Engine design; Engine performance; Engine operating conditions; Air fuel ratio; Emission standards; Engine speeds; Service life; Durability

5/20 Trucks and Trailers

HS-011 208 Fld. 5/20

HORSEPOWER REQUIREMENTS OF UTILITY TRUCK HYDRAULIC SYSTEMS

by Donald H. Groft

Stelco, Inc.

1972 10p
Report no. SAE-720149

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

The hydraulic power systems used on many public utility vehicles are getting larger and more complicated as the manufacturers of these systems strive for additional performance and economy. More and more labor-saving devices are being introduced. Each new device further complicates the system. A tremendous amount of simplification is necessary before these developments can be efficiently utilized. This paper reviews the power requirements and operation of the hydraulics systems currently being used on the public utility truck.

Search terms: Horsepower; Hydraulic equipment; Industrial trucks; Truck power; Dump trucks; Utilities

AVAILABILITY: SAE

HS-011 209 Fld. 5/20

AN ENGINEERING APPROACH TO SOLVING ENVIRONMENTAL PROBLEMS IN CONSUMER PRODUCT INDUSTRIES

by R. H. Lincoln

Outboard Marine Corp.

1972 6p 5refs
Report no. SAE-720167

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

A system is described which permits analysis of problems and rank ordering of action alternatives in areas of environmental concern. Complex interrelationships of various types of problems are discussed. Factors, to be considered and weighed before establishing program priorities, are pointed out. It is concluded that only through use of a logical systematic approach to environmental problems can panic programs be avoided and money and manpower be utilized most effectively. The system is applied to consideration of the snowmobile and its possible contribution to the problems of air and noise pollution, consumerism, and safety.

Search terms: Environmental planning; Environmental research; Environmental factors; Systems analysis; Consumer complaints; Consumer dissatisfaction; Engineering; Snowmobiles; Vehicle air pollution; Vehicle noise

AVAILABILITY: SAE

HS-011 210 Fld. 5/20; 2/7; 5/22

CAN WE DO AWAY WITH SPLASH AND SPRAY?

by T. D. Sherard

Published in *Traffic Safety* v71 n11 p24-6, 38 (Nov 1971)

Large trucks, especially when traveling at 50 mph or more, cause a problem of splash and spray. The trucking industry is interested in solving this problem for the sake of safety and public relations. Attempts have been made to solve the splash and spray problem by using mudflaps and side fenders, but these have not proved effective enough. The role of the tire and the pavement in causing splash and spray are described. Improved pavement drainage is needed to solve the problem.

Search terms: Wet road conditions; Trucking industry; Mudflaps; Fender design; Splash control; Splash; Accident risks; Truck design; High speed; Drainage; Pavement condition; Tire pavement interface

5/22 Wheel Systems

HS-011 211 Fld. 5/22; 2/4

EFFECTS OF STUDDED TIRES ON PAVEMENTS AND TRAFFIC SAFETY IN MINNESOTA

by C. K. Preus

Minnesota Dept. of Highways

1972 16p 17refs
Report no. SAE-720117

Presented at Automotive Engineering Congress, Detroit, 10-14 Jan 1972.

Increasing winter abrasion of pavement surfaces led the 1969 Minnesota Lesislature to order the Minnesota Highway Department to conduct an in-depth study of studded tire effects relating to pavement wear and safety. In the laboratory, studded tires without sand and salt abraded pavement specimens 100 times faster than unstudded tires with sand and salt. Laboratory wear rates correlated with those found on highway pavements. If pavement wear should continue to increase at the same rate, premature repairs would become necessary at great cost. Accident studies

5/22 Wheel Systems (Cont'd.)

HS-011 211 (Cont'd.)

indicated that on icy and snowy roads studded tires provide slight advantage over snow tires, but it was considered unlikely that discontinuance of studded tires would make an appreciable change in traffic safety in Minnesota.

Search terms: Pavement damage; Abrasion; Studded tires; Pavement wear; Minnesota; Laboratory tests; Salts effects; Sand; Icy road conditions; Wet road conditions; Snow tires; Damage costs; Stopping distance; Winter driving; Highway safety; Winter accidents; Wear tests

AVAILABILITY: SAE

NHTSA DOCUMENTS

NHTSA Contractors Reports

HS-800 542 Fld. 5/14

DEVELOPMENT AND TESTING OF AN AIRBAG AND ENERGY ABSORBING LAP BELT COMBINATION RESTRAINT SYSTEM. FINAL REPORT

Michigan Univ. Hwy. Safety Res. Inst.

1971 26p
Contract FH-11-6962

An energy-absorbing lap belt system was designed to be used in conjunction with an inflatable restraint system for protection of the front passenger of a standard size car. The force deflection characteristics of the belt system were determined on the basis of analytical simulation of occupant motions in front collisions, including interactions with the inflatable restraint system, as well as on the basis of dynamic tension tests of energy absorbing lap belt material. Four impact sled tests were conducted at 30 mph using the combined system to restrain a 50th precentile dummy. Test data indicated acceptable performance during all four impacts.

Search terms: Air bag restraint systems; Energy absorbing systems; Seat belts; Front end collisions; Dynamic tests; Energy absorbing materials; Materials tests; Performance tests; Impact tests; Impact sleds; Simulation models; Occupant protection; Occupant kinematics; Restraint system tests; Impact forces; Deflection; Front seat passengers; Loading tests

AVAILABILITY: NTIS

HS-800 614 Fld. 3/1

THE PERCEPTION OF DWI LAWS: A STUDY OF THE GENERAL AWARENESS AND THE ATTITUDES OF PUBLIC AND OFFICIAL GROUPS TOWARDS THE DRINKING DRIVING LAWS. FINAL REPORT

by Robert F. Borkenstein; Hans G. Klette; Jere J. Joiner; William G. Picton

Indiana Univ.

1971 221p 27refs
Contract DOT-HS-034-1-050

Public perception of drunk driving laws was surveyed, using a questionnaire. Approximately half the public group were unaware of the definition of the drinking-driving laws. Awareness of penalties was even lower. All groups, public and official, showed a minimal knowledge of the actual drinking-driving situation as it would relate to the legal definition. An experiment was performed to study the best means of increasing awareness of these laws among members of the public and among officials and to improve their attitudes toward the laws. Public and official groups were exposed to one of three educational treatments: a lecture, a pamphlet, or a breath test. A combination of the treatments used in this experiment spread over a long period of time could succeed in educating the public to the concept of blood alcohol concentration and to the attendant drinking-driving behavioral factors.

Search terms: Alcohol laws; Drinking drivers; Driver intoxication; Public opinion; Alcohol education; Alcohol breath tests; Alcohol usage deterrents; Alcohol education materials; Blood alcohol levels; Questionnaires; Legal factors; Penalties; Attitudes; Surveys; Psychological factors; Perception

AVAILABILITY: NTIS

HS-800 630 Fld. 3/1; 4/1

COURT PROCEDURES FOR IDENTIFYING PROBLEM DRINKERS. REPORT ON PHASE 1. INTERIM REPORT

by R. G. Mortimer; L. D. Filkins; J. S. Lower; M. W. Kerlan; D. V. Post; B. Mudge; C. Rosenblatt

Michigan Univ. Hwy. Safety Res. Inst.

1971 178p refs
Contract FH-11-7615
Report no. HSRI-71-119; HuF-9

An extensive literature search was undertaken to obtain tests which would distinguish between problem and social drinkers. Questionnaires and interviews were developed and administered to 297 control subjects and 192 problem drinkers. Answers were statistically analyzed and all items which did not strongly discriminate were eliminated. A final questionnaire of 54 items and interview of 52 items were developed and validated. A scoring procedure was developed to classify persons into three categories: problem drinkers, presumptive problem drinkers, and nonproblem drinkers. Examination of the driving records of control and alcoholic samples showed that the alcoholics had significantly more violations and accidents.

Such data can also be used to supplement test scores in diagnosing presumptive problem drinkers. A manual for use by court counselors was developed and tested.

Search terms: Drinking drivers; Driver intoxication; Reviews; Problem drivers; Social drinking; Questionnaires; Interviews; Alcoholism; Statistical analysis; Diagnosis; Courts; Driver characteristics; Driver age; Driver sex; Marital status; Traffic law violators; Accident repeater drivers; Discriminate analysis; Male drivers; Female drivers; Driver records

AVAILABILITY: NTIS

HS-800 631 Fld. 3/1; 4/1

COURT PROCEDURES FOR IDENTIFYING PROBLEM DRINKERS. FINAL REPORT. PHASE 2

by R. G. Mortimer; L. D. Filkins; J. S. Lower

Michigan Univ. Hwy. Safety Res. Inst.

1971 32p 11refs
Contract FH-11-7615
Report no. HSRI-71-120; HuF-11

Court procedures for diagnosing problem drinkers among drivers convicted of alcohol-related driving offenses were studied. A manual was tested with 69 convicted drivers. Interviewers also made a separate diagnosis of problem drinking. There was good agreement between the interviewers' diagnoses and those obtained by use of the manual. The manual diagnosed 66% of the convicted drivers as problem drinkers. The manual was also applied to 60 convicted drivers in a different research program, and over 60% of these drivers were diagnosed as problem drinkers. Useful comments were obtained from interviewers in both field trials of the manual, which was further revised. Further field testing and validation are needed to ascertain the continuing effectiveness of the procedures incorporated in the manual.

Search terms: Drinking drivers; Driver intoxication; Problem drivers; Interviews; Alcoholism; Statistical analysis; Diagnosis; Courts; Driver records; Questionnaires; Traffic law violators; Accident repeater drivers; Convictions; Manuals

AVAILABILITY: NTIS

HS-800 632 Fld. 3/1; 4/1

COURT PROCEDURES FOR IDENTIFYING PROBLEM DRINKERS. VOL. 1. MANUAL

by M. W. Kerlan; R. G. Mortimer; Mudge; L. D. Filkins

Michigan Univ. Hwy. Safety Res. Inst.

1971 69p 37refs
Contract FH-11-7615
Report no. HSRI-71-119; HuF-10a

Cover title: *Revised Diagnostic Manual.*

A manual was developed for identifying problem drinkers. The procedures were intended for use in a court setting, such as a pre-sentence investigation, but may be used in other settings. The procedures may be used by persons not having a great deal of experience or expertise in diagnosing problem drinkers. The manual contains the questionnaire, the interview protocol, and other recommended practices for identifying problem drinkers.

Search terms: Drinking drivers; Driver intoxication; Problem drivers; Questionnaires; Interviews; Alcoholism; Diagnosis; Courts; Manuals; Driver characteristics; Blood alcohol levels; Driver records; Traffic law violators; Accident repeater drivers

AVAILABILITY: NTIS

HS-800 633 Fld. 3/1; 4/1

COURT PROCEDURES FOR IDENTIFYING PROBLEM DRINKERS. VOL. 2. SUPPLEMENTAL READINGS

by B. Mudge; M. W. Kerlan; D. V. Post; R. G. Mortimer; L. D. Filkins

Michigan Univ. Hwy. Safety Res. Inst.

1971 65p 62refs
Contract FH-11-7615
Report no. HSRI-71-119; HuF-106

Procedures for identification of problem drinkers were developed, suitable for use by persons not having a great deal of prior experience or expertise in diagnosing problem drinkers. A description of interviewer qualifications necessary to perform the tasks in the identification procedures is provided, together with a discussion of the program philosophy, a rationale for selection of the questionnaire items, and a section describing the consequences of alcohol abuse.

Search terms: Drinking drivers; Driver intoxication; Problem drivers; Interviews; Alcoholism; Diagnosis; Courts; Alcohol effects; Driver records; Medical factors

AVAILABILITY: NTIS

HS-800 634 Fld. 3/1; 4/2

GUIDELINES FOR DEVELOPING AND IMPLEMENTING COMMUNITY PROGRAMS TO ASSIST AND RE-EDUCATE DRINKING DRIVERS. VOL. 1. FINAL REPORT

by H. Sackman

University of Southern California

1972 120p
Contract DOT-HS-010-1-010

A prototype community program to assist and retrain convicted drinking

NHTSA Contractors Reports (Cont'd.)

HS-800 634 (Cont'd.)

drivers was developed. The object of the program was to assist communities in implementing local Alcohol Safety Action Programs by testing the feasibility, acceptance, costs, and effectiveness of a prototype community demonstration. Topics discussed include program planning, management and evaluation, particular types of assistance utilized—namely, counseling, class retraining, crisis intervention, and group therapy.

Search terms: Drinking drivers; Driver intoxication; Driver improvement measurement; Alcohol Safety Action Projects; Community support; Alcohol usage deterrents; Demonstration projects; Convictions; Program evaluation; Psychotherapy; Flow charts; Driver rehabilitation; Court cooperation with other agencies; Benefit cost analysis; Alcoholism; Problem drivers; Emergency services; Santa Monica

AVAILABILITY: NTIS

HS-800 635 Fld. 3/1; 4/2

COMMUNITY DEMONSTRATION PLAN TO ASSIST AND RE-EDUCATE DRINKING DRIVERS. VOL. 2. FINAL REPORT

by H. Sackman; O. Didenko; M. Thomas

University of Southern California

1972 177p 44refs
Contract DOT-HS-010-1-010

A prototype community demonstration program to retrain and rehabilitate convicted drinking drivers was developed. The preparation and planning of the program up to the implementation phase are described. The literature was reviewed. A proposed community demonstration plan was evaluated by a professional review panel. Aspects discussed include group therapy for drinking drivers, hot line and emergency assistance programs, systems analysis in community action programs, counseling and classes for drinking drivers.

Search terms: Drinking drivers; Driver intoxication; Driver improvement measurement; Community support; Alcohol Safety Action Projects; Alcohol usage deterrents; Demonstration projects; Convictions; Program evaluation; Psychotherapy; Systems analysis; Driver rehabilitation; Alcoholism; Problem drivers; Emergency services; Telephones; Santa Monica

AVAILABILITY: NTIS

HS-800 636 Fld. 3/1; 4/2

RESULTS OF THE SANTA MONICA PROTOTYPE PROGRAM TO ASSIST AND RE-EDUCATE DRINKING DRIVERS. VOL. 3. FINAL REPORT

by H. Sackman; D. Didenko; T. Tang; M. Thomas

University of Southern California

1972 116p 127refs
Contract DOT-HS-010-1-010

A prototype community demonstration program to retrain and assist convicted drinking drivers was conducted. Sixty court-assigned subjects who were convicted of drinking-driving charges in Santa Monica were subjected to a 12-week program including individual counseling, class retraining sessions, group therapy, and crisis intervention in the form of hot line-driver assistance services. Results led to tentative conclusions that individual counseling and class retraining were successful; standardized initial and exit interviews appeared to be the most cost effective forms of counseling; group therapy results were generally favorable but there were problems; class retraining was universally approved by participants; crisis intervention was not cost effective.

Search terms: Drinking drivers; Driver intoxication; Driver improvement measurement; Community support; Alcohol Safety Action Projects; Alcohol usage deterrents; Demonstration projects; Convictions; Program evaluation; Psychotherapy; Driver rehabilitation; Alcoholism; Problem drivers; Emergency services; Telephones; Benefit cost analysis; Interviews; Santa Monica

AVAILABILITY: NTIS

HS-800 640 Fld. 4/1

A SYSTEMS ANALYSIS OF THE TRAFFIC LAW SYSTEM. SUMMARY VOLUME. FINAL REPORT

by Kent B. Joscelyn; Ralph K. Jones

Indiana Univ.

1971 76p
Contract FH-11-7270
Report no. FH-11-7270-72-1

The traffic law system operates through a risk-management process to attempt to keep dysfunctions within the highway transportation system at an acceptable level. The four major functional components within which the activities of the traffic law system may be grouped are law generation, enforcement, adjudication, and sanctioning. Systems analysis concepts have been applied to define more precisely the objectives of the traffic law system and identify alternatives and modifications that will allow the system to manage risk more effectively. The focus of the study is the operation of the system on man in his role as a driver. It is concluded that the present system is conceptually sound but lacks resources to be most effective, and does not utilize existing resources as effectively as possible; that the

components of the system are not coordinated; and that the nature of risk management needs research.

Search terms: Traffic laws; Traffic law enforcement; Systems analysis; Highway transportation; Man machine systems; Driver vehicle road interfaces; Manpower utilization; Flow charts; Accident risks; Penalties; Police traffic services; Traffic courts

AVAILABILITY: NTIS

HS-800 641 Fld. 4/1

A SYSTEMS ANALYSIS OF THE TRAFFIC LAW SYSTEM. REFERENCE VOL. 1. FINAL REPORT

by Kent B. Joscelyn; Ralph K. Jones

Indiana Univ.

1972 187p 124refs
Contract FH-11-7270
Report no. FH-11-7270-72-2

Systems analysis concepts have been applied to define more precisely the objectives of the traffic law system and identify alternatives and modifications that will allow the system to manage risk more effectively. This volume contains a survey of the literature, a report of two conferences held by the Institute for Research in Public Safety (Indiana University) and sponsored by the National Highway Traffic Safety Administration, and an approach to a classification of traffic law systems.

Search terms: Traffic laws; Systems analysis; Reviews; Traffic law enforcement; Penalties; Problem drivers; Highway transportation; Traffic law violators; Police traffic services; Traffic courts; Classification

AVAILABILITY: NTIS

HS-800 642 Fld. 4/1

A SYSTEMS ANALYSIS OF THE TRAFFIC LAW SYSTEM. REFERENCE VOL. 2. FINAL REPORT

by Kent B. Joscelyn; Ralph K. Jones; James P. Economos

Indiana Univ.

1972 268p
Contract FH-11-7270
Report no. FH-11-7270-72-3

Systems analysis concepts have been applied to define more precisely the objectives of the traffic law system and identify alternatives and modifications that will allow the system to manage risk more effectively. The focus of the study is the operation of the system on man in his role as a driver. This volume presents an example of the use of systems analysis techniques to modify the traffic law system through the use of a quantitative model. A case study of the Fairfax County, Virginia, traffic law system was made. Procedures used in conducting a behavior and attitude survey and responses to the survey are described. Results of the test of the Fairfax County traffic law enforcement function are discussed.

Search terms: Traffic laws; Traffic law enforcement; Systems analysis; Highway transportation; Man machine systems; Driver vehicle road interfaces; Penalties; Traffic courts; Police traffic services; Flow charts; Traffic law violators; Problem drivers; Manpower utilization; Law enforcement effect on accident rates; Driver attitudes; Driver behavior; Virginia; Public opinion; Male drivers; Female drivers; Interviews; Questionnaires

AVAILABILITY: NTIS

HS-800 643 Fld. 4/1

A SYSTEMS ANALYS TRAFFIC LAW REFERENCE VOL. REPORT

by Kent B. Joscelyn; Ralph

Indiana Univ.

1972 85p
Contract FH-11-7270
Report no. FH-11-7270-72

Systems analysis concep applied to define more objectives of the traffic la identify alternatives and that will allow the system more effectively. The focu is the operation of the sys his role as a driver. This vo an example of the use analysis techniques to mod law system through th quantitative model, consis mathematical expressions precisely how the variou subsystems relate to the e the system as a whole. differs fundamentally fron or a game, in that the ur system effectiveness can from any physically rea values of the model's variables.

Search terms: Traffic la enforcement; Systems a way transportation; systems; Driver vehicle r Mathematical models; V charts; Markov proces risk forecasting; Traffic Problem drivers; Proba Mathematical analy drivers; Accident preve usage deterrents; Benefi Manpower utilization

AVAILABILITY: NT

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